



## QoS

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This chapter contains the following QoS commands:

- [class](#), on page 2
- [class-map](#), on page 4
- [debug qos](#), on page 6
- [match \(class-map configuration\)](#), on page 7
- [mls qos](#), on page 9
- [mls qos cos](#), on page 11
- [mls qos map](#), on page 13
- [mls qos rewrite ip dscp](#), on page 14
- [mls qos srr-queue output cos-map](#), on page 16
- [mls qos srr-queue output dscp-map](#), on page 18
- [mls qos trust](#), on page 20
- [police](#), on page 22
- [policy map](#), on page 24
- [priority-queue out](#), on page 26
- [service-policy](#), on page 27
- [set](#), on page 28
- [show class-map](#), on page 30
- [show mls qos](#), on page 31
- [show mls qos interface](#), on page 32
- [show mls qos maps](#), on page 36
- [show policy-map](#), on page 39
- [srr-queue bandwidth limit](#), on page 40
- [srr-queue bandwidth shape](#), on page 41
- [srr-queue bandwidth share](#), on page 43

# class

To define a traffic classification match criteria for the specified class-map name, use the **class** command in policy-map configuration mode. Use the **no** form of this command to delete an existing class map.

```
class {class-map-name | class-default}
no class {class-map-name | class-default}
```

## Syntax Description

*class-map-name* Assigns a name to the class map.

**class-default** Refers to a system default class that matches unclassified packets.

## Command Default

No policy map class-maps are defined.

## Command Modes

Policy-map configuration

## Command History

Release	Modification
Cisco IOS Release 15.2(7)E1	This command was introduced.

## Usage Guidelines

Before using the **class** command, you must use the **policy-map** global configuration command to identify the policy map and enter policy-map configuration mode. After specifying a policy map, you can configure a policy for new classes or modify a policy for any existing classes in that policy map. You attach the policy map to a port by using the **service-policy** interface configuration command.

After entering the **class** command, you enter policy-map class configuration mode. These configuration commands are available:

- **exit**—Exits policy-map class configuration mode and returns to policy-map configuration mode.
- **no**—Returns a command to its default setting.
- **police**—Defines a policer for the classified traffic. The policer specifies the bandwidth limitations and the action to take when the limits are exceeded. For more information, see **police**.
- **set**—Specifies a value to be assigned to the classified traffic. For more information, see **set**.

To return to policy-map configuration mode, use the **exit** command. To return to privileged EXEC mode, use the **end** command.

The **class** command performs the same function as the **class-map** global configuration command. Use the **class** command when a new classification, which is not shared with any other ports, is needed. Use the **class-map** command when the map is shared among many ports.

You can configure a default class by using the **class class-default** policy-map configuration command. Unclassified traffic (traffic that does not meet the match criteria specified in the traffic classes) is treated as default traffic.

## Examples

This example shows how to configure a default traffic class to a policy map:

```
Device# configure terminal
```

```

Device(config)# class-map cm-3
Device(config-cmap)# match ip dscp 30
Device(config-cmap)# exit
Device(config)# class-map cm-4
Device(config-cmap)# match ip dscp 40
Device(config-cmap)# exit
Device(config)# policy-map pm3
Device(config-pmap)# class class-default
Device(config-pmap-c)# set dscp 10
Device(config-pmap-c)# exit
Device(config-pmap)# class cm-3
Device(config-pmap-c)# set dscp 4
Device(config-pmap-c)# exit
Device(config-pmap)# class cm-4
Device(config-pmap-c)# exit
Device(config-pmap)# exit

```

You can verify your settings by entering the **show policy-map** privileged EXEC command.

This example shows how the default traffic class is automatically placed at the end of policy-map pm3 even though **class-default** was configured first:

```

Device# show policy-map pm3
  Policy Map pm3
    Class cm-3
      set dscp 4
    Class class-default
      set dscp 10
Device#

```

## Related Commands

Command	Description
<b>class</b>	Creates a class map to be used for matching packets to the class whose name you specify.
<b>police</b>	Defines a policer for classified traffic.
<b>policy-map</b>	Creates or modifies a policy map that can be attached to multiple ports to specify a service policy.
<b>set</b>	Classifies IP traffic by setting a DSCP or IP-precedence value in the packet.
<b>show policy map</b>	Displays quality of service (QoS) policy maps.

# class-map

To create a class map to be used for matching packets to the class whose name you specify and to enter class-map configuration mode, use the **class-map** command in global configuration mode. Use the **no** form of this command to delete an existing class map and to return to global or policy map configuration mode.

**class-map** *class-map-name*  
**no class-map** *class-map-name*

## Syntax Description

*class-map-name* Name of the class for the class map. The class name is used for both the class map and to configure a policy for the class in the policy map.

## Command Default

No class maps are defined.

## Command Modes

Global configuration  
 Policy map configuration

## Command History

Release	Modification
Cisco IOS Release 15.2(7)E1	This command was introduced.

## Usage Guidelines

The **class-map** command and its subcommands are used to define packet classification, marking, and aggregate policing as part of a globally named service policy applied on a per-port basis.

After you are in quality of service (QoS) class-map configuration mode, these configuration commands are available:

- **description**—Describes the class map (up to 200 characters). The **show class-map** privileged EXEC command displays the description and the name of the class map.
- **exit**—Exits from QoS class-map configuration mode.
- **match**—Configures classification criteria. .
- **no**—Removes a match statement from a class map.

To define packet classification on a physical-port basis, only one **match** command per class map is supported.

Only one ACL can be configured in a class map. The ACL can have multiple access control entries (ACEs).

## Examples

This example shows how to configure the class map called *class1* with one match criterion, which is an access list called *103*:

```
Device(config)# access-list 103 permit ip any any dscp 10
Device(config)# class-map class1
Device(config-cmap)# match access-group 103
Device(config-cmap)# exit
```

This example shows how to delete the class map *class1*:

```
Device(config)# no class-map class1
```

You can verify your settings by entering the **show class-map** privileged EXEC command.

Related Commands	Command	Description
	class	Defines a traffic classification match criteria (through the <b>police</b> , <b>set</b> , and <b>trust</b> policy-map class configuration commands) for the specified class-map name.
	show class-map	Displays QoS class maps.

# debug qos

To enable debugging of the quality of service (QoS) software, use the **debug qos** in privileged EXEC mode. Use the **no** form of this command to disable QoS debugging.

**debug qos** {**capability** | **command-installation-time** | **events** | **index** | **pre-classify** | **provision** | **service-policy** | **set** | **snmp** | **tunnel\_marking**}  
**no debug qos** {**capability** | **command-installation-time** | **events** | **index** | **pre-classify** | **provision** | **service-policy** | **set** | **snmp** | **tunnel\_marking**}

## Syntax Description

<b>capability</b>	Displays all QoS capability debug messages.
<b>command-installation-time</b>	Displays the amount of time the QoS command takes to become effective.
<b>events</b>	Displays QoS MQC events.
<b>index</b>	Displays class-based QoS MIB index persistency.
<b>pre-classify</b>	Displays QoS pre-classify events for VPN.
<b>provision</b>	Displays QoS provisions.
<b>service-policy</b>	Displays QoS service policies.
<b>set</b>	Displays QoS packet marking.
<b>snmp</b>	Displays class-based QoS configuration and statistics information.
<b>tunnel_marking</b>	Displays QoS packet tunnel marking.

## Command Default

Debugging is disabled.

## Command Modes

Privileged EXEC

## Command History

Release	Modification
Cisco IOS Release 15.2(7)E1	This command was introduced.

## Usage Guidelines

The **undebug qos** command is the same as the **no debug qos** command.

When you enable debugging on a switch stack, it is enabled only on the active switch. To enable debugging on a member switch, you can start a session from the active switch by using the **session switch-number** privileged EXEC command, then enter the **debug** command at the command-line prompt of the member switch. You also can use the **remote command stack-member-number LINE** privileged EXEC command on the active switch to enable debugging on a member switch without first starting a session.

## Related Commands

Command	Description
show debugging	Displays information about the types of debugging that are enabled.

## match (class-map configuration)

To define the match criteria to classify traffic, use the **match** command in class-map configuration mode. Use the **no** form of this command to remove the match criteria.

```
match {access-group acl-index-or-name | ip {dscp dscp-list }}
no match {access-group acl-index-or-name | ip {dscp dscp-list }}
```

### Syntax Description

<b>access-group</b> <i>acl-index-or-name</i>	Specifies the number or name of an access control list (ACL). The range is from 1 to 2799.
<b>ip</b>	Sets IP specific values. <ul style="list-style-type: none"> <li>• <b>dscp</b> <i>dscp-list</i>—Lists up to eight IP Differentiated Services Code Point (DSCP) values to match against incoming packets. Separate each value with a space. The range is 0 to 63. You also can enter a mnemonic name for a commonly used value.</li> <li>• <b>precedence</b> <i>ip-precedence-list</i>—Lists up to eight IP-precedence values to match against incoming packets. Separate each value with a space. The range is 0 to 7. You also can enter a mnemonic name for a commonly used value.</li> </ul>

### Command Default

No match criteria are defined.

### Command Modes

Class-map configuration

### Command History

Release	Modification
Cisco IOS Release 15.2(7)E1	This command was introduced.

### Usage Guidelines

The **match** command is used to specify which fields in the incoming packets are examined to classify the packets. Only the IP access group or the MAC access group matching to the Ether Type/Len are supported.

If you enter the **class-map match-any** *class-map-name* global configuration command, you can enter the following **match** commands:

- **match access-group** *name acl-name*
- **match ip dscp** *dscp-list*

You cannot enter the **match access-group** *acl-index* command.

For the **match ip dscp** *dscp-list* command, you can enter a mnemonic name for a commonly used value. For example, you can enter the **match ip dscp af11** command, which is the same as entering the **match ip dscp 10** command. For a list of supported mnemonics, enter the **match ip dscp ?** command to see the command-line help strings.

You can verify your settings by entering the **show class-map** privileged EXEC command.

### Examples

This example shows how to create a class map called *class2*, which matches all the incoming traffic with DSCP values of 10, 11, and 12:

```
Device(config)# class-map class2
Device(config-cmap)# match ip dscp 10 11 12
Device(config-cmap)# exit
```



# mls qos

To enable quality of service (QoS) for the entire switch, use the **mls qos** command in global configuration mode. Use the **no** form of this command to reset all the QoS-related statistics and to disable the QoS features for the entire switch.

**mls qos**  
**no mls qos**

**Syntax Description** This command has no arguments or keywords.

**Command Default** QoS is disabled. There is no concept of trusted or untrusted ports because the packets are not modified (the CoS, DSCP, and IP precedence values in the packet are not changed). Traffic is switched in pass-through mode (packets are switched without any rewrites and classified as best effort without any policing).

When QoS is enabled with the **mls qos** global configuration command and all other QoS settings are set to their defaults, traffic is classified as best effort (the DSCP and CoS value is set to 0) without any policing. No policy maps are configured. The default port trust state on all ports is untrusted. The default egress queue settings are in effect.

**Command Modes** Global configuration

Command History	Release	Modification
	Cisco IOS Release 15.2(7)E1	This command was introduced.

**Usage Guidelines** When the **mls qos** command is entered, QoS is enabled with the default parameters on all ports in the system. QoS must be globally enabled to use QoS classification, policing, marking or dropping, queueing, and traffic shaping features. You can create a policy map and attach it to a port before entering the **mls qos** command. QoS processing is disabled until you enter the **mls qos** command.

When you enter the **no mls qos** command, policy maps and class maps that are used to configure QoS are not deleted from the configuration, but entries corresponding to policy maps are removed from the switch hardware to save system resources. To reenab QoS with the previous configurations, enter the **mls qos** command.

Toggling the QoS status of the switch with this command modifies (reallocates) the sizes of the queues. During the queue size modification, the queue is temporarily shut down during the hardware reconfiguration, and the switch drops newly arrived packets for this queue.

## Examples

This example shows how to enable QoS on the switch:

```
Device(config)# mls qos
```

You can verify your settings by entering the **show mls qos** privileged EXEC command.

---

**Related Commands**

<b>Command</b>	<b>Description</b>
<b>show mls qos</b>	Displays QoS information.

## mls qos cos

To define the default class of service (CoS) value of a port or to assign the default CoS to all incoming packets on the port, use the **mls qos cos** command in interface configuration mode. Use the **no** form of this command to return to the default setting.

```
mls qos cos {default-cos | override}
no qos mls cos {default-cos | override}
```

<b>Syntax Description</b>	<p><b>default-cos</b> The default CoS value that is assigned to a port. If packets are untagged, the default CoS value becomes the packet CoS value. The CoS range is 0 to 7.</p> <p><b>override</b> Overrides the CoS value of the incoming packets, and apply the default CoS value on the port to all incoming packets.</p>				
<b>Command Default</b>	The default CoS value for a port is 0. CoS override is disabled.				
<b>Command Modes</b>	Interface configuration				
<b>Command History</b>	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Cisco IOS Release 15.2(7)E1</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Cisco IOS Release 15.2(7)E1	This command was introduced.
Release	Modification				
Cisco IOS Release 15.2(7)E1	This command was introduced.				

**Usage Guidelines** You can use the default value to assign a CoS and Differentiated Services Code Point (DSCP) value to all incoming packets that are untagged (if the incoming packet does not have a CoS value). You also can assign a default CoS and DSCP value to all incoming packets by using the **override** keyword.

Use the **override** keyword when all incoming packets on certain ports deserve higher or lower priority than packets entering from other ports. Even if a port is previously set to trust DSCP, CoS, or IP precedence, this command overrides the previously configured trust state, and all the incoming CoS values are assigned the default CoS value configured with the **mls qos cos** command. If an incoming packet is tagged, the CoS value of the packet is modified with the default CoS of the port at the ingress port.

### Examples

This example shows how to configure the default port CoS to 4 on a port:

```
Device(config)# interface gigabitethernet2/0/1
Device(config-if)# mls qos trust cos
Device(config-if)# mls qos cos 4
```

This example shows how to assign all the packets entering a port to the default port CoS value of 4 on a port:

```
Device(config)# interface gigabitethernet2/0/1
Device(config-if)# mls qos cos 4
Device(config-if)# mls qos cos override
```

You can verify your settings by entering the **show mls qos interface** privileged EXEC command.

---

**Related Commands**

Command	Description
show mls qos interface	Displays quality of service (QoS) information.

## mls qos map

To define the DSCP-to-DSCP-mutation map, use the **mls qos map** command in global configuration mode. Use the **no** form of this command to return to the default map.

```
mls qos map {dscp-mutation dscp-mutation-name in-dscp to out-dscp}
no mls qos map {dscp-mutation dscp-mutation-name in-dscp to out-dscp}
```

### Syntax Description

#### **dscp-mutation**

*dscp-mutation-name in-dscp to out-dscp*

Defines the DSCP-to-DSCP-mutation map.

For *dscp-mutation-name*, enter the mutation map name.

For *in-dscp*, enter up to eight DSCP values, with each value separated by a space, then enter the **to** keyword.

For *out-dscp*, enter a single DSCP value.

The range is 0 to 63.

### Command Default

When this command is disabled, the default maps are set.

The default DSCP-to-DSCP-mutation map is a null map, which maps an incoming DSCP value to the same DSCP value.

The default policed-DSCP map is a null map, which maps an incoming DSCP value to the same DSCP value.

### Command Modes

Global configuration

### Command History

#### Release

Cisco IOS Release 15.2(7)E1

#### Modification

This command was introduced.

### Usage Guidelines

All the maps are globally defined. The DSCP-to-DSCP-mutation map is applied to a specific port.

This example shows how to define the DSCP-to-DSCP-mutation map. All the entries that are not explicitly configured are not modified (remain as specified in the null map):

```
Device# configure terminal
Device(config)# mls qos map dscp-mutation mutation1 1 2 3 4 5 6 7 to 10
Device(config)# mls qos map dscp-mutation mutation1 8 9 10 11 12 13 to 10
Device(config)# mls qos map dscp-mutation mutation1 20 21 22 to 20
Device(config)# mls qos map dscp-mutation mutation1 0 31 32 33 34 to 30
```

You can verify your settings by entering the **show mls qos maps** privileged EXEC command.

### Related Commands

Command	Description
<b>mls qos dscp-mutstion</b>	Applies a DSCP-to-DSCP-mutation map to a DSCP-trusted port.
<b>show mls qos maps</b>	Displays quality of service (QoS) mapping information.

## mls qos rewrite ip dscp

To configure the switch to change or rewrite the Differentiated Services Code Point (DSCP) field of an incoming IP packet, use the **mls qos rewrite ip dscp** command in global configuration mode. Use the **no** form of this command to configure the switch to not modify or rewrite the DSCP field of the packet and to enable DSCP transparency.

**mls qos rewrite ip dscp**  
**no mls qos rewrite ip dscp**

### Syntax Description

This command has no arguments or keywords.

### Command Default

DSCP transparency is disabled. The switch changes the DSCP field of the incoming IP packet.

### Command Modes

Global configuration

### Command History

Release	Modification
Cisco IOS Release 15.2(7)E1	This command was introduced.

### Usage Guidelines

DSCP transparency affects only the DSCP field of a packet at the egress. If DSCP transparency is enabled by using the **no mls qos rewrite ip dscp** command, the switch does not modify the DSCP field in the incoming packet, and the DSCP field in the outgoing packet is the same as that in the incoming packet.



**Note** Enabling DSCP transparency does not affect the port trust settings on IEEE 802.1Q tunneling ports.

By default, DSCP transparency is disabled. The switch modifies the DSCP field in an incoming packet, and the DSCP field in the outgoing packet is based on the quality of service (QoS) configuration, including the port trust setting, policing and marking, and the DSCP-to-DSCP mutation map.

Regardless of the DSCP transparency configuration, the switch modifies the internal DSCP value of the packet that the switch uses to generate a class of service (CoS) value representing the priority of the traffic. The switch also uses the internal DSCP value to select an egress queue and threshold.

For example, if QoS is enabled and an incoming packet has a DSCP value of 32, the switch might modify the internal DSCP value based on the policy-map configuration and change the internal DSCP value to 16. If DSCP transparency is enabled, the outgoing DSCP value is 32 (same as the incoming value). If DSCP transparency is disabled, the outgoing DSCP value is 16 because it is based on the internal DSCP value.

### Examples

This example shows how to enable DSCP transparency and configure the switch to not change the DSCP value of the incoming IP packet:

```
Device(config)# mls qos
Device(config)# no mls qos rewrite ip dscp
```

This example shows how to disable DSCP transparency and configure the switch to change the DSCP value of the incoming IP packet:

```
Device(config)# mls qos  
Device(config)# mls qos rewrite ip dscp
```

You can verify your settings by entering the **show running config include rewrite** privileged EXEC command.

**Related Commands**

Command	Description
<b>mls qos</b>	Enables QoS globally.
<b>show mls qos</b>	Displays QoS information.
<b>show running-config   include rewrite</b>	Displays the DSCP transparency setting.

## mls qos srr-queue output cos-map

To map class of service (CoS) values to an egress queue or to map CoS values to a queue and to a threshold ID, use the **mls qos srr-queue output cos-map** command global configuration mode. Use the **no** form of this command to return to the default setting.

```
mls qos srr-queue output cos-map queue queue-id {cos1 ... cos8 | threshold threshold-id cos1 ... cos8
}
no mls qos srr-queue output cos-map
```

### Syntax Description

<b>queue</b> <i>queue-id</i>	Specifies a queue number. For <i>queue-id</i> , the range is 1 to 4.
<i>cos1 ... cos8</i>	CoS values that are mapped to an egress queue. For <i>cos1...cos8</i> , enter up to eight values, and separate each value with a space. The range is 0 to 7.
<b>threshold</b> <i>threshold-id</i> <i>cos1...cos8</i>	Maps CoS values to a queue threshold ID. For <i>threshold-id</i> , the range is 1 to 3. For <i>cos1...cos8</i> , enter up to eight values, and separate each value with a space. The range is 0 to 7.

### Command Default

For default CoS output queue thresholds values, see *Default Cos Output Queue Threshold Map*.

### Command Modes

Global configuration

### Command History

Release	Modification
Cisco IOS Release 15.2(7)E1	This command is introduced.

### Usage Guidelines

The drop-threshold percentage for threshold 3 is predefined. It is set to the queue-full state.



**Note** The egress queue default settings are suitable for most situations. Change them only when you have a thorough understanding of the egress queues and if these settings do not meet your quality of service (QoS) solution.

You can map each CoS value to a different queue and threshold combination, allowing the frame to follow different behavior.

*Table 1: Default Cos Output Queue Threshold Map*

CoS Value	0	1	2	3	4	5	6	7
Queue ID–Threshold ID	2–1	2–1	3–1	3–1	4–1	1–1	4–1	4–1



**Examples:**

This example shows how to map a port to queue set 1. It maps CoS values 0 to 3 to egress queue 1 and to threshold ID 1.

```
Device(config)# mls qos srr-queue output cos-map queue 1 threshold 1 0 1 2 3
```

**Related Commands**

Command	Description
<b>mls qos srr-queue output dscp-map</b>	Maps Differentiated Services Code Point (DSCP) values to an egress queue or maps DSCP values to a queue and to a threshold ID.
<b>show mls qos maps</b>	Displays QoS mapping information.

## mls qos srr-queue output dscp-map

To map Differentiated Services Code Point (DSCP) values to an egress queue or to map DSCP values to a queue and to a threshold ID, use the **mls qos srr-queue output dscp-map** command in global configuration mode. Use the **no** form of this command to return to the default setting.

```
mls qos srr-queue output dscp-map queue queue-id { dscp1 ... dscp8 | threshold threshold-id dscp1 ... dscp8 }
```

```
no mls qos srr-queue output dscp-map
```

### Syntax Description

<b>queue</b> <i>queue-id</i>	Specifies a queue number. For <i>queue-id</i> , the range is 1 to 4.
<i>dscp1 ... dscp8</i>	DSCP values that are mapped to an egress queue. For <i>dscp1...dscp8</i> , enter up to eight values, and separate each value with a space. The range is 0 to 63.
<b>threshold</b> <i>threshold-id dscp1...dscp8</i>	Maps DSCP values to a queue threshold ID. For <i>threshold-id</i> , the range is 1 to 3. For <i>dscp1...dscp8</i> , enter up to eight values, and separate each value with a space. The range is 0 to 63.

### Command Default

The default DSCP output queue thresholds are set.

### Command Modes

Global configuration

### Command History

Release	Modification
Cisco IOS Release 15.2(7)E1	This command was introduced.

### Usage Guidelines

The drop-threshold percentage for threshold 3 is predefined. It is set to the queue-full state.

For default DSCP output queue-threshold map values, see *Default DSCP Output Queue Threshold Map*.



**Note** The egress queue default settings are suitable for most situations. Change them only when you have a thorough understanding of the egress queues and if these settings do not meet your QoS solution.

You can map each DSCP value to a different queue and threshold combination, allowing the frame to follow different behavior.

You can map up to eight DSCP values per command.

**Table 2: Default DSCP Output Queue Threshold Map**

DSCP Value	0-7	8-15	16-23	24-31	32-39	40-47	48-55	56-63
Queue ID-Threshold ID	2-1	2-1	3-1	3-1	4-1	1-1	4-1	4-1

**Examples**

This example shows how to map a port to queue set 1. It maps DSCP values 0 to 3 to egress queue 1 and to threshold ID 1.

```
Device(config)# mls qos srr-queue output dscp-map queue 1 threshold 1 0 1 2 3
```

**Related Commands**

Command	Description
<b>mls qos srr-queue output cos-map</b>	Maps class of service (CoS) values to an egress queue or maps CoS values to a queue and to a threshold ID.

## mls qos trust

To configure the port trust state, use the **mls qos trust** command in interface configuration mode. Use the **no** form of this command to return a port to its untrusted state.

```
mls qos trust [{cos | device {cisco-phone | cts | ip-camera | media-player} | dscp}]
no mls qos trust [{cos | device {cisco-phone | cts | ip-camera | media-player} | dscp}]
```

### Syntax Description

<b>cos</b>	(Optional) Classifies an ingress packet by using the packet CoS value. For an untagged packet, use the port default CoS value.
<b>device cisco-phone</b>	(Optional) Classifies an ingress packet by trusting the CoS or DSCP value sent from the Cisco IP Phone (trusted boundary), depending on the trust setting.
<b>device {cts   ip-camera   media-player}</b>	(Optional) Classifies an ingress packet by trusting the CoS or DSCP value for these video devices: <ul style="list-style-type: none"> <li>• <b>cts</b>—Cisco TelePresence System</li> <li>• <b>ip-camera</b>—Cisco IP camera</li> <li>• <b>media-player</b>—Cisco digital media player</li> </ul> For an untagged packet, use the port default CoS value.
<b>dscp</b>	(Optional) Classifies an ingress packet by using the packet DSCP value (most significant 6 bits of 8-bit service-type field). For a non-IP packet, the packet CoS is used if the packet is tagged. For an untagged packet, the default port CoS value is used.

### Command Default

The port is not trusted. If no keyword is specified when you enter the command, the default is **dscp**.

### Command Modes

Interface configuration

### Command History

Release	Modification
Cisco IOS Release 15.2(7)E1	This command was introduced.

### Usage Guidelines

Packets entering a quality of service (QoS) domain are classified at the edge of the domain. When the packets are classified at the edge, the switch port within the QoS domain can be configured to one of the trusted states because there is no need to classify the packets at every switch within the domain. Use this command to specify whether the port is trusted and which fields of the packet to use to classify traffic.

When a port is configured with trust DSCP or trust IP precedence and the incoming packet is a non-IP packet, the CoS-to-DSCP map is used to derive the corresponding DSCP value from the CoS value. The CoS can be the packet CoS for trunk ports or the port default CoS for nontrunk ports.

If the DSCP is trusted, the DSCP field of the IP packet is not modified. However, it is still possible that the CoS value of the packet is modified (according to DSCP-to-CoS map).

If the CoS is trusted, the CoS field of the packet is not modified, but the DSCP can be modified (according to CoS-to-DSCP map) if the packet is an IP packet.

The trusted boundary feature prevents security problems if users disconnect their PCs from networked Cisco IP Phones and connect them to the switch port to take advantage of trusted CoS or DSCP settings. You must globally enable the Cisco Discovery Protocol (CDP) on the switch and on the port connected to the IP phone. If the telephone is not detected, trusted boundary disables the trusted setting on the switch or routed port and prevents misuse of a high-priority queue.

If you configure the trust setting for DSCP or IP precedence, the DSCP or IP precedence values in the incoming packets are trusted. If you configure the **mls qos cos override** interface configuration command on the switch port connected to the IP phone, the switch overrides the CoS of the incoming voice and data packets and assigns the default CoS value to them.

For an inter-QoS domain boundary, you can configure the port to the DSCP-trusted state and apply the DSCP-to-DSCP-mutation map if the DSCP values are different between the QoS domains.

Classification using a port trust state (for example, **mls qos trust [cos | dscp]**) and a policy map (for example, **service-policy input policy-map-name**) are mutually exclusive. The last one configured overwrites the previous configuration.

### Examples:

This example shows how to specify that the Cisco IP Phone connected on a port is a trusted device:

```
Device(config)# interface gigabitethernet2/0/1
Device(config-if)# mls qos trust device cisco-phone
```

You can verify your settings by entering the **show mls qos interface** privileged EXEC command.

### Related Commands

Command	Description
<b>mls qos cos</b>	Defines the default CoS value of a port or assigns the default CoS to all incoming packets on the port.
<b>mls qos map</b>	Defines the CoS-to-DSCP map, DSCP-to-CoS map, the DSCP-to-DSCP-mutation map, the IP-precedence-to-DSCP map, and the policed-DSCP map.
<b>show mls qos interface</b>	Displays QoS information.

# police

To define a policer for classified traffic, use the **police** command in policy-map class configuration mode. Use the **no** form of this command to remove an existing policer.

**police** *rate-bps burst-byte* [**exceed-action drop**]  
**no police** *rate-bps burst-byte* [**exceed-action drop** ]

## Syntax Description

*rate-bps* Specifies the average traffic rate in bits per second (b/s). The range is 8000 to 10000000000.

*burst-byte* Specifies the normal burst size in bytes. The range is 8000 to 1000000.

**exceed-action drop** (Optional) Sets the traffic rate. If the rate is exceeded, the switch drops the packet .

## Command Default

No policers are defined.

## Command Modes

Policy-map class configuration

## Command History

Release	Modification
Cisco IOS Release 15.2(7)E1	This command was introduced.

## Usage Guidelines

A policer defines a maximum permissible rate of transmission, a maximum burst size for transmissions, and an action to take if either maximum is exceeded.

The port ASIC device, which controls more than one physical port, supports 256 policers on the switch (255 user-configurable policers plus 1 policer reserved for internal use). The maximum number of configurable policers supported per port is 63. Policers are allocated on demand by the software and are constrained by the hardware and ASIC boundaries. You cannot reserve policers per port. There is no guarantee that a port will be assigned to any policer.

To return to policy-map configuration mode, use the **exit** command. To return to privileged EXEC mode, use the **end** command.

Policing uses a token-bucket algorithm. You configure the bucket depth (the maximum burst that is tolerated before the bucket overflows) by using the *burst-byte* option of the **police** policy-map class configuration command. You configure how quickly (the average rate) the tokens are removed from the bucket by using the *rate-bps* option of the **police** policy-map class configuration command. For more information, see the software configuration guide for this release.

## Examples

This example shows how to configure a policer that drops packets if traffic exceeds 1 Mb/s average rate with a burst size of 20 KB. The DSCPs of incoming packets are trusted, and there is no packet modification.

```
Device(config)# policy-map policy1
Device(config-pmap)# class class1
Device(config-pmap-c)# police 1000000 20000 exceed-action drop
Device(config-pmap-c)# exit
```

You can verify your settings by entering the **show policy-map** privileged EXEC command.

Related Commands	Command	Description
	<b>class</b>	Defines a traffic classification match criteria (through the <b>police</b> , <b>set</b> , and <b>trust</b> policy-map class configuration commands) for the specified class-map name.
	<b>class-map</b>	Create a class map to be used for matching packets to the class whose name you specify with the <b>class</b> command.
	<b>mls qos map policed-dscp</b>	Applies a policed-DSCP map to a DSCP-trusted port.
	<b>policy map</b>	Creates or modifies a policy map that can be attached to multiple ports to specify a service policy.
	<b>set</b>	Classifies IP traffic by setting a DSCP or IP-precedence value in the packet.
	<b>show policy-map</b>	Displays QoS policy maps.

# policy map

To create or modify a policy map that can be attached to multiple physical ports and to enter policy-map configuration mode, use the **policy-map** command in global configuration mode. Use the **no** form of this command to delete an existing policy map and to return to global configuration mode.

**policy-map** *policy-map-name*  
**no policy-map** *policy-map-name*

## Syntax Description

*policy-map-name* The name of the policy map.

## Command Default

No policy maps are defined.

The default behavior is to set the Differentiated Services Code Point (DSCP) to 0 if the packet is an IP packet and to set the class of service (CoS) to 0 if the packet is tagged. No policing is performed.

## Command Modes

Global configuration

## Command History

### Release

Cisco IOS Release 15.2(7)E1

### Modification

This command was introduced.

## Usage Guidelines

After entering the **policy-map** command, you enter policy-map configuration mode, and these configuration commands are available:

- **class**—Defines the classification match criteria for the specified class map.
- **description**—Describes the policy map (up to 200 characters).
- **exit**—Exits policy-map configuration mode and returns you to global configuration mode.
- **no**—Removes a previously defined policy map.

To return to global configuration mode, use the **exit** command. To return to privileged EXEC mode, use the **end** command.

Before configuring policies for classes whose match criteria are defined in a class map, use the **policy-map** command to specify the name of the policy map to be created, added to, or modified. Entering the **policy-map** command also enables the policy-map configuration mode in which you can configure or modify the class policies for that policy map.

You can configure class policies in a policy map only if the classes have match criteria defined for them. To configure the match criteria for a class, use the **class-map** global configuration and **match** class-map configuration commands. You define packet classification on a physical-port basis.

You can configure QoS only on physical ports. Configure the QoS settings, such as classification, queueing, and scheduling, and apply the policy map to a port. When configuring QoS on a physical port, you apply a nonhierarchical policy map to a port. A nonhierarchical policy map is the same as the port-based policy maps in the device.

## Examples

This example shows how to create a policy map called *policy1*.



```
Device(config)# policy-map policy1
```

This example shows how to delete *polycymap2*:

```
Device(config)# no policy-map polycymap2
```

You can verify your settings by entering the **show policy-map** privileged EXEC command.

**Related Commands**

<b>Command</b>	<b>Description</b>
<b>class</b>	Defines a traffic classification match criteria (through the <b>police</b> , <b>set</b> , and <b>trust</b> policy-map class configuration command) for the specified class-map name.
<b>class-map</b>	Creates a class map to be used for matching packets to the class whose name you specify.
<b>service-policy</b>	Applies a policy map to a physical port.
<b>show policy-map</b>	Displays QoS policy maps.

## priority-queue out

To enable the egress priority queue, use the **priority-queue out** command in interface configuration mode. Use the **no** form of this command to disable the priority queue.

**priority-queue out**

**no priority-queue out**

---

### Command Modes

Interface configuration mode (config-if)

---

### Command History

Release	Modification
Cisco IOS Release 15.2(7)E1	This command was introduced.

### Examples:

This example shows how to enable the egress priority queue:

```
Device> enable
Device# configure terminal
Device(config)# interface GigabitEthernet 1/0/1
Device(config-if)# srr-queue bandwidth shape 3 0 0 0
Device(config-if)# priority-queue out
```

# service-policy

To apply a policy map to the input of a physical port, use the **service-policy** command in interface configuration mode. Use the **no** form of this command to remove the policy map and port association.

**service-policy input** *policy-map-name*  
**no service-policy input** *policy-map-name*

<b>Syntax Description</b>	<b>input</b> Applies the policy map to the input of an interface.				
	<i>policy-map-name</i> Specifies the name of the policy-map.				
<b>Command Default</b>	No policy maps are attached to the port.				
<b>Command Modes</b>	Interface configuration				
<b>Command History</b>	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Cisco IOS Release 15.2(7)E1</td> <td>This command was introduced,</td> </tr> </tbody> </table>	Release	Modification	Cisco IOS Release 15.2(7)E1	This command was introduced,
Release	Modification				
Cisco IOS Release 15.2(7)E1	This command was introduced,				

**Usage Guidelines**

Though visible in the command-line help strings, the **output** keyword is not supported.

Policy maps can be configured on physical ports. A policy map is defined by the **policy map** command.

Only one policy map is supported per port, per direction. In other words, only one input policy and one output policy is allowed on any one port.

You can apply a policy map to incoming traffic on a physical port. .

Classification using a port trust state (for example, **mls qos trust [cos | dscp | ]**) and a policy map (for example, **service-policy input policy-map-name**) are mutually exclusive. The last one configured overwrites the previous configuration.

## Examples

This example shows how to remove *plcmap2* from a physical port:

```
Device(config)# interface gigabitethernet2/0/2
Device(config-if)# no service-policy input plcmap2
```

You can verify your settings by entering the **show running-config** privileged EXEC command.

Related Commands	Command	Description
	<b>policy map</b>	Creates or modifies a policy map that can be attached to multiple ports to specify a service policy.
	<b>show policy-map</b>	Displays QoS policy maps.
	<b>show running-config</b>	Displays the operating configuration.

# set

To classify IP traffic by setting a Differentiated Services Code Point (DSCP) or an IP-precedence value in the packet, use the **set** command in policy-map class configuration mode. Use the **no** form of this command to remove traffic classification.

```
set [ip]dscp new-dscp
no set [ip]dscp new-dscp
```

<b>Syntax Description</b>	<b>ip</b>	Sets the IP values.
	<b>dscp</b> <i>new-dscp</i>	Sets the DSCP value in IPv4 and IPv6 packets. The range is 0 to 63.
<b>Command Default</b>	No traffic classification is defined.	
<b>Command Modes</b>	Policy-map class configuration	
<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Cisco IOS Release 15.2(7)E1	This command was introduced.

**Usage Guidelines** If you have used the **set ip dscp** policy-map class configuration command, the device changes this command to **set dscp** in the device configuration. If you enter the **set ip dscp** policy-map class configuration command, this setting appears as **set dscp** in the device configuration.

You can use the **set ip precedence** policy-map class configuration command or the **set precedence** policy-map class configuration command. This setting appears as **set ip precedence** in the device configuration.

The **set** command is mutually exclusive with the **trust** policy-map class configuration command within the same policy map.

For the **set dscp new-dscp** or the **set ip precedence new-precedence** command, you can enter a mnemonic name for a commonly used value. For example, you can enter the **set dscp af11** command, which is the same as entering the **set dscp 10** command. You can enter the **set ip precedence critical** command, which is the same as entering the **set ip precedence 5** command. For a list of supported mnemonics, enter the **set dscp ?** or the **set ip precedence ?** command to see the command-line help strings.

To return to policy-map configuration mode, use the **exit** command. To return to privileged EXEC mode, use the **end** command.

## Examples

This example shows how to assign DSCP 10 to all FTP traffic without any policers:

```
Device(config)# policy-map policy_ftp
Device(config-pmap)# class-map ftp_class
Device(config-cmap)# exit
Device(config)# policy-map policy_ftp
Device(config-pmap)# class ftp_class
Device(config-pmap-c)# set dscp 10
Device(config-pmap)# exit
```

You can verify your settings by entering the **show policy-map** privileged EXEC command.

# show class-map

To display quality of service (QoS) class maps, which define the match criteria to classify traffic, use the **show class-map** command in EXEC mode.

```
show class-map [class-map-name | type control subscriber {all | class-map-name}]
```

## Syntax Description

*class-map-name* (Optional) Class map name.

**type control subscriber** (Optional) Displays information about control class maps.

**all** (Optional) Displays information about all control class maps.

## Command Modes

User EXEC

Privileged EXEC

## Command History

Release	Modification
Cisco IOS Release 15.2(7)E1	This command was introduced.

## Examples

This is an example of output from the **show class-map** command:

```
Device# show class-map
Class Map match-any videowizard_10-10-10-10 (id 2)
  Match access-group name videowizard_10-10-10-10

Class Map match-any class-default (id 0)
  Match any
Class Map match-any dscp5 (id 3)
  Match ip dscp 5
```

# show mls qos

To display global quality of service (QoS) configuration information, use the **show mls qos** command in EXEC mode.

**show mls qos**

## Syntax Description

This command has no arguments or keywords.

## Command Modes

User EXEC

Privileged EXEC

## Command History

Release	Modification
Cisco IOS Release 15.2(7)E1	This command was introduced.

## Examples

This is an example of output from the **show mls qos** command when QoS is enabled and Differentiated Services Code Point (DSCP) transparency is disabled:

```
Device# show mls qos
QoS is enabled
QoS ip packet dscp rewrite is disabled
```

This is an example of output from the **show mls qos** command when QoS is enabled and DSCP transparency is enabled:

```
Device# show mls qos
QoS is enabled
QoS ip packet dscp rewrite is enabled
```

## Related Commands

Command	Description
<b>mls qos</b>	Enables QoS on the entire switch.

# show mls qos interface

To display quality of service (QoS) information at the port level, use the **show mls qos interface** command in EXEC mode.

**show mls qos interface** [*interface-id*] {**policers** | **queueing** | **statistics**} [**stack-port statistics**]

Syntax Description		
<i>interface-id</i>	(Optional) Displays the QoS information for the specified port. Valid interfaces include physical ports.	
<b>policers</b>	(Optional) Displays the policers for the interfaces.	
<b>queueing</b>	(Optional) Displays the queueing strategy (shared or shaped) and the weights corresponding to the queues.	
<b>statistics</b>	(Optional) Displays statistics for sent and received Differentiated Services Code Points (DSCPs) and class of service (CoS) values, the number of packets enqueued or dropped per egress queue, and the number of in-profile and out-of-profile packets for each policer.	
<b>stack-port statistics</b>	(Optional) Displays the QoS statistics for the stacking ports.	

Command Modes	
	User EXEC
	Privileged EXEC

Command History	Release	Modification
	Cisco IOS Release 15.2(7)E1	This command was introduced.

**Usage Guidelines** Though visible in the command-line help string, the **policers** keyword is not supported.

## Examples

This is an example of output from the **show mls qos interface** *interface-id* command when port-based QoS is enabled:

```
Device# show mls qos interface gigabitethernet1/0/1
GigabitEthernet1/0/1
trust state: trust cos
trust mode: trust cos
trust enabled flag: ena
COS override: dis
default COS: 0
DSCP Mutation Map: Default DSCP Mutation Map
Trust device: none
qos mode: port-based
```

This is an example of output from the **show mls qos interface** *interface-id* command when port-based QoS is disabled:



```

Device# show mls qos interface gigabitethernet1/0/1
GigabitEthernet1/0/1
QoS is disabled. When QoS is enabled, following settings will be applied
trust state: trust cos
trust mode: trust cos
trust enabled flag: ena
COS override: dis
default COS: 0
DSCP Mutation Map: Default DSCP Mutation Map
Trust device: none
qos mode: port-based

```

This is an example of output from the **show mls qos interface *interface-id* queueing** command. The egress expedite queue overrides the configured shaped round robin (SRR) weights.

```

Device# show mls qos interface gigabitethernet1/0/2 queueing
GigabitEthernet1/0/2
Egress Priority Queue :enabled
Shaped queue weights (absolute) : 25 0 0 0
Shared queue weights : 25 25 25 25
The port bandwidth limit : 100 (Operational Bandwidth:100.0)
The port is mapped to qset : 1

```

This is an example of output from the **show mls qos interface *interface-id* statistics** command:

```

Device# show mls qos interface gigabitethernet1/0/1 statistics
GigabitEthernet1/0/1 (All statistics are in packets)

```

```

dscp: incoming
-----
 0 - 4 :      15233          0          0          0          0
 5 - 9 :          0          0          0          0          0
10 - 14 :          0          0          0          0          0
15 - 19 :          0          0          0          0          0
20 - 24 :          0          0          0          0          0
25 - 29 :          0          0          0          0          0
30 - 34 :          0          0          0          0          0
35 - 39 :          0          0          0          0          0
40 - 44 :          0          0          0          0          0
45 - 49 :          0          0          0      406417          0
50 - 54 :          0          0          0          0          0
55 - 59 :          0          0          0          0          0
60 - 64 :          0          0          0          0          0
dscp: outgoing
-----
 0 - 4 :          337          0          0          0          0
 5 - 9 :          0          0          0          0          0
10 - 14 :          0          0          0          0          0
15 - 19 :          0          0          0          0          0
20 - 24 :          0          0          0          0          0
25 - 29 :          0          0          0          0          0
30 - 34 :          0          0          0          0          0
35 - 39 :          0          0          0          0          0
40 - 44 :          0          0          0          0          0
45 - 49 :          0          0          0      13866          0
50 - 54 :          0          0          0          0          0
55 - 59 :          0          0          0          0          0
60 - 64 :          0          0          0          0          0
cos: incoming
-----

```

## show mls qos interface

```

0 - 4 :      1426270          0          0          0          0
5 - 7 :           0          0          0
cos: outgoing
-----
0 - 4 :      131687          12          0          0          7478
5 - 7 :       1993         25483         275213
output queues enqueued:
queue:   threshold1  threshold2  threshold3
-----
queue 0:           0           0           0
queue 1:           0          341         441525
queue 2:           0           0           0
queue 3:           0           0           0

output queues dropped:
queue:   threshold1  threshold2  threshold3
-----
queue 0:           0           0           0
queue 1:           0           0           0
queue 2:           0           0           0
queue 3:           0           0           0

Policer: Inprofile:          0 OutofProfile:          0

```

This table describes the fields in this display.

**Table 3: show mls qos interface statistics Field Descriptions**

Field		Description
DSCP	incoming	Number of packets received for each DSCP value.
	outgoing	Number of packets sent for each DSCP value.
CoS	incoming	Number of packets received for each CoS value.
	outgoing	Number of packets sent for each CoS value.
Output queues	enqueued	Number of packets in the egress queue.
	dropped	Number of packets in the egress queue that are dropped.
Policer	Inprofile	Number of in-profile packets for each policer.
	Outofprofile	Number of out-of-profile packets for each policer.

### Related Commands

Command	Description
<b>mls qos srr-queue output cos-map</b>	Maps CoS values to an egress queue or maps CoS values to a queue and to a threshold ID.
<b>mls qos srr-queue output dscp-map</b>	Maps DSCP values to an egress queue or maps DSCP values to a queue and to a threshold ID.
<b>srr-queue bandwidth limit</b>	Limits the maximum output on a port.

Command	Description
<b>srr-queue bandwidth shape</b>	Assigns the shaped weights and enables bandwidth shaping on the four egress queues mapped to a port.
<b>srr-queue bandwidth share</b>	Assigns the shared weights and enables bandwidth sharing on the four egress queues mapped to a port.

# show mls qos maps

To display quality of service (QoS) mapping information, use the **show mls qos maps** command in EXEC mode.

**show mls qos maps** [{**cos-output-q** | **dscp-mutation** *dscp-mutation-name*}]

Syntax Description	
<b>cos-output-q</b>	(Optional) Displays the CoS output queue threshold map.
<b>dscp-mutation</b> <i>dscp-mutation-name</i>	(Optional) Displays the specified DSCP-to-DSCP-mutation map.

**Command Default** None

**Command Modes** User EXEC  
Privileged EXEC

Command History	Release	Modification
	Cisco IOS Release 15.2(7)E1	This command was introduced.

**Usage Guidelines** During classification, QoS uses the mapping tables to represent the priority of the traffic and to derive a corresponding class of service (CoS) or Differentiated Services Code Point (DSCP) value from the received CoS, DSCP, or IP precedence value.

The policed-DSCP, DSCP-to-CoS, and the DSCP-to-DSCP-mutation maps appear as a matrix. The d1 column specifies the most-significant digit in the DSCP. The d2 row specifies the least-significant digit in the DSCP. The intersection of the d1 and d2 values provides the policed-DSCP, the CoS, or the mutated-DSCP value. For example, in the DSCP-to-CoS map, a DSCP value of 43 corresponds to a CoS value of 5.

The DSCP output queue threshold maps appear as a matrix. The d1 column specifies the most-significant digit of the DSCP number. The d2 row specifies the least-significant digit in the DSCP number. The intersection of the d1 and the d2 values provides the queue ID and threshold ID. For example, in the DSCP output queue threshold map, a DSCP value of 43 corresponds to queue 1 and threshold 3 (01-03).

The CoS output queue threshold maps show the CoS value in the top row and the corresponding queue ID and threshold ID in the second row. For example, in the CoS output queue threshold map, a CoS value of 5 corresponds to queue 1 and threshold 3 (1-3).

## Examples

This is an example of output from the **show mls qos maps** command:

```
Device# show mls qos maps
  Policed-dscp map:
  d1 : d2 0  1  2  3  4  5  6  7  8  9
-----
  0 :   00 01 02 03 04 05 06 07 08 09
  1 :   10 11 12 13 14 15 16 17 18 19
  2 :   20 21 22 23 24 25 26 27 28 29
  3 :   30 31 32 33 34 35 36 37 38 39
  4 :   40 41 42 43 44 45 46 47 48 49
  5 :   50 51 52 53 54 55 56 57 58 59
  6 :   60 61 62 63
```

```

Dscp-cos map:
d1 : d2 0 1 2 3 4 5 6 7 8 9
-----
0 :    00 00 00 00 00 00 00 00 01 01
1 :    01 01 01 01 01 01 02 02 02 02
2 :    02 02 02 02 03 03 03 03 03 03
3 :    03 03 04 04 04 04 04 04 04 04
4 :    05 05 05 05 05 05 05 05 06 06
5 :    06 06 06 06 06 06 07 07 07 07
6 :    07 07 07 07

Cos-dscp map:
cos:  0 1 2 3 4 5 6 7
-----
dscp:  0 8 16 24 32 46 48 56

IpPrecedence-dscp map:
ipprec:  0 1 2 3 4 5 6 7
-----
dscp:  0 8 16 24 32 40 48 56

Dscp-outputq-threshold map:
d1 :d2  0 1 2 3 4 5 6 7 8 9
-----
0 :    03-03 03-03 03-03 03-03 03-03 03-03 03-03 03-03 04-01 04-01
1 :    04-02 04-01 04-02 04-01 04-02 04-01 02-01 02-01 02-01 02-01
2 :    02-01 02-01 02-01 02-01 02-02 03-01 02-01 02-01 02-01 02-01
3 :    02-01 02-01 01-03 01-03 02-01 02-01 02-01 02-01 02-01 02-01
4 :    01-03 01-03 01-03 01-03 01-03 01-03 01-03 01-03 01-03 02-03
5 :    02-03 02-03 02-03 02-03 02-03 02-03 02-03 02-03 02-03 02-03
6 :    02-03 02-03 02-03 02-03

Cos-outputq-threshold map:
cos:  0 1 2 3 4 5 6 7
-----
queue-threshold: 3-3 4-3 2-1 2-2 1-3 1-3 2-3 2-3

Dscp-dscp mutation map:
Default DSCP Mutation Map:
d1 : d2 0 1 2 3 4 5 6 7 8 9
-----
0 :    00 01 02 03 04 05 06 07 08 09
1 :    10 11 12 13 14 15 16 17 18 19
2 :    20 21 22 23 24 25 26 27 28 29
3 :    30 31 32 33 34 35 36 37 38 39
4 :    40 41 42 43 44 45 46 47 48 49
5 :    50 51 52 53 54 55 56 57 58 59
6 :    60 61 62 63

```

**Related Commands**

Command	Description
<b>mls qos map</b>	Defines the CoS-to-DSCP map, DSCP-to-CoS map, DSCP-to-DSCP-mutation map, IP-precedence-to-DSCP map, and the policed-DSCP map.
<b>mls qos srr-queue output cos-map</b>	Maps CoS values to an egress queue or maps CoS values to a queue and to a threshold ID.

Command	Description
<b>mls qos srr-queue output dscp-map</b>	Maps DSCP values to an egress queue or maps DSCP values to a queue and to a threshold ID.

# show policy-map

To display quality of service (QoS) policy maps, which define classification criteria for incoming traffic, use the **show policy-map** command in EXEC mode.

```
show policy-map [ policy-map-name ]
```

## Syntax Description

*policy-map-name* (Optional) The policy map name.

## Command Modes

User EXEC

Privileged EXEC

## Command History

### Release

Cisco IOS Release 15.2(7)E1

### Modification

This command was introduced.

## Usage Guidelines

Policy maps can include policers that specify the bandwidth limitations and the action to take if the limits are exceeded.



**Note** Though visible in the command-line help string, the **session**, **type**, **control-plane**, and **interface** keywords are not supported; statistics shown in the display should be ignored.

## Examples

This is an example of output from the **show policy-map** command:

```
Device# show policy-map
Policy Map videowizard_policy2
  class videowizard_10-10-10-10
    set dscp 34
    police 100000000 2000000 exceed-action drop

Policy Map mypolicy
  class dscp5
    set dscp 6
```

## Related Commands

Command	Description
<b>policy map</b>	Creates or modifies a policy map that can be attached to multiple ports to specify a service policy.

# srr-queue bandwidth limit

To limit the maximum output on a port, use the **srr-queue bandwidth limit** command in interface configuration mode. Use the **no** form of this command to return to the default setting.

**srr-queue bandwidth limit** *weight1*  
**no srr-queue bandwidth limit**

## Syntax Description

*weight1* The port speed limit in percentage terms. The range is 10 to 90.

## Command Default

The port is not rate limited and is set to 100 percent.

## Command Modes

Interface configuration

## Command History

Release	Modification
Cisco IOS Release 15.2(7)E1	This command was introduced.

## Usage Guidelines

If you configure this command to 80 percent, the port is idle 20 percent of the time. The line rate drops to 80 percent of the connected speed. These values are not exact because the hardware adjusts the line rate in increments of six.

## Examples

This example shows how to limit a port to 800 Mb/s:

```
Device(config)# interface gigabitethernet2/0/1
Device(config-if)# srr-queue bandwidth limit 80
```

You can verify your settings by entering the **show mls qos interface [interface-id] queueing** privileged EXEC command.

## Related Commands

Command	Description
<b>mls qos srr-queue output dscp-map</b>	Maps DSCP values to an egress queue or maps DSCP values to a queue and to a threshold ID.
<b>srr-queue bandwidth shape</b>	Assigns the shaped weights and enables bandwidth shaping on the four egress queues mapped to a port.
<b>srr-queue bandwidth share</b>	Assigns the shared weights and enables bandwidth sharing on the four egress queues mapped to a port.



## srr-queue bandwidth shape

To assign the shaped weights and to enable bandwidth shaping on the four egress queues mapped to a port, use the **srr-queue bandwidth shape** command in interface configuration mode. Use the **no** form of this command to return to the default setting.

**srr-queue bandwidth shape** *weight1 weight2 weight3 weight4*  
**no srr-queue bandwidth shape**

<b>Syntax Description</b>	<i>weight1 weight2 weight3 weight4</i>	The weights that specify the percentage of the port that is shaped. The inverse ratio ( $1/weight$ ) specifies the shaping bandwidth for this queue. Separate each value with a space. The range is 0 to 65535.
<b>Command Default</b>	Weight1 is set to 25; weight2, weight3, and weight4 are set to 0, and these queues are in shared mode.	
<b>Command Modes</b>	Interface configuration	
<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Cisco IOS Release 15.2(7)E1	This command was introduced.

**Usage Guidelines**

In shaped mode, the queues are guaranteed a percentage of the bandwidth, and they are rate-limited to that amount. Shaped traffic does not use more than the allocated bandwidth even if the link is idle. Use shaping to smooth bursty traffic or to provide a smoother output over time.

The shaped mode overrides the shared mode.

If you configure a shaped queue weight to 0 by using the **srr-queue bandwidth shape** interface configuration command, this queue participates in shared mode. The weight specified with the **srr-queue bandwidth shape** command is ignored, and the weights specified with the **srr-queue bandwidth share** interface configuration command for a queue come into effect.

When configuring queues for the same port for both shaping and sharing, make sure that you configure the lowest numbered queue for shaping.



**Note** The egress queue default settings are suitable for most situations. You should change them only when you have a thorough understanding of the egress queues and if these settings do not meet your QoS solution.

### Examples

This example shows how to configure the queues for the same port for both shaping and sharing. Queues 2, 3, and 4 operate in the shared mode, because the weight ratios for these queues are set to 0. The bandwidth weight for queue 1 is 1/8, which is 12.5 percent. Queue 1 is guaranteed this bandwidth and limited to it; it does not extend its slot to the other queues even if the other queues have no traffic and are idle. Queues 2, 3, and 4 are in shared mode, and the setting for queue 1 is ignored. The bandwidth ratio allocated for the queues in shared mode is  $4/(4+4+4)$ , which is 33 percent:

```
Device(config)# interface gigabitethernet2/0/1
Device(config-if)# srr-queue bandwidth shape 8 0 0 0
Device(config-if)# srr-queue bandwidth share 4 4 4 4
```

You can verify your settings by entering the **show mls qos interface** [*interface-id*] **queueing** privileged EXEC command.

#### Related Commands

Command	Description
<b>mls qos queue-set output dscp-map</b>	Maps DSCP values to an egress queue or maps DSCP values to a queue and to a threshold ID.
<b>srr-queue bandwidth share</b>	Assigns the shared weights and enables bandwidth sharing on the four egress queues mapped to a port.

## srr-queue bandwidth share

To assign the shared weights and to enable bandwidth sharing on the four egress queues mapped to a port, use the **srr-queue bandwidth share** command in interface configuration mode. Use the **no** form of this command to return to the default setting.

```
srr-queue bandwidth share weight1 weight2 weight3 weight4
no srr-queue bandwidth share
```

<b>Syntax Description</b>	<i>weight1 weight2 weight3 weight4</i> <i>weight4</i>	The ratios of <i>weight1</i> , <i>weight2</i> , <i>weight3</i> , and <i>weight4</i> specify the ratio of the frequency in which the SRR scheduler dequeues packets. Separate each value with a space. The range is 1 to 255.
<b>Command Default</b>	Equal bandwidth is allocated to each queue (Equal bandwidth for weight1, weight2, weight3, and weight4).	
<b>Command Modes</b>	Interface configuration	
<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	Cisco IOS Release 15.2(7)E1	This command was introduced.

**Usage Guidelines** The ratio of the weights is the ratio of frequency in which the shaped round-robin (SRR) scheduler dequeues packets from each queue.

The absolute value of each weight is meaningless, and only the ratio of parameters is used.

In shared mode, the queues share the bandwidth among them according to the configured weights. The bandwidth is guaranteed at this level but not limited to it. For example, if a queue empties and does not require a share of the link, the remaining queues can expand into the unused bandwidth and share it among themselves.

If you configure a shaped queue weight to 0 by using the **srr-queue bandwidth shape** interface configuration command, this queue participates in SRR shared mode. The weight specified with the **srr-queue bandwidth shape** command is ignored, and the weights specified with the **srr-queue bandwidth share** interface configuration command for a queue take effect.

When configuring queues for the same port for both shaping and sharing, make sure that you configure the lowest numbered queue for shaping.



**Note** The egress queue default settings are suitable for most situations. Change them only when you have a thorough understanding of the egress queues and if these settings do not meet your QoS solution.

### Examples

This example shows how to configure the weight ratio of the SRR scheduler running on an egress port. Four queues are used. The bandwidth ratio allocated for each queue in shared mode is  $1/(1+2+3+4)$ ,  $2/(1+2+3+4)$ ,  $3/(1+2+3+4)$ , and  $4/(1+2+3+4)$ , which is 10 percent, 20 percent, 30 percent, and 40 percent for queues 1, 2, 3, and 4. This means that queue 4 has four times the bandwidth of queue 1, twice the bandwidth of queue 2, and one-and-a-third times the bandwidth of queue 3.

```
Device(config)# interface gigabitethernet2/0/1
Device(config-if)# srr-queue bandwidth share 1 2 3 4
```

You can verify your settings by entering the **show mls qos interface** [*interface-id* **queueing**] privileged EXEC command.

#### Related Commands

Command	Description
<b>mls qos srr-queue output dscp-map</b>	Maps Differentiated Services Code Point (DSCP) values to an egress queue or maps DSCP values to a queue and to a threshold ID.
<b>show mls qos interface</b>	Displays quality of service (QoS) information.
<b>srr-queue bandwidth shape</b>	Assigns the shaped weights and enables bandwidth shaping on the four egress queues mapped to a port.